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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,954	02/14/2004	Asmus G. Hetzel	CDN.P0096	9185

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EXAMINER	
ROSSOSHEK, YELENA	
ART UNIT	**PAPER NUMBER**
2825	

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/779,954	HETZEL, ASMUS G.	
	Examiner	Art Unit	
	Helen Rossoshek	2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the Application 10/779,954 filed 02/14/2004.

2. Claims 1-30 are pending in the Application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims1-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Frank et al. (US Patent Application Publication 20050223348).

With respect to claims 1, 19 Frank et al. teaches a method of routing a route that connects a start geometry and a target geometry, the route being comprised of one or more connected route segments within a method of evaluating signal trace discontinuities in an electronic design (abstract), wherein as shown on the Fig. 2 five-level package model 24A includes plurality of traces 36, 40 and 44 and each is segmented into plurality of design elements such as 36A, 36B, 36C, 40A, 40B, 44A, 44B, wherein each trace having their own geometry with a start and target point (paragraph [0011]), a computer readable medium that stores a computer program for routing a route that connects a start geometry and a target geometry, the route being

comprised of one or more connected route segments within a software product comprising instructions executable by a computer and stored on computer-readable media for evaluating signal trace (routing)(paragraph [0022]), comprising: a) producing at least one potential route segment as shown on the Fig. 5 representing model 124A and having, for example, trace 144 (segment) segmented into traces 144A, 144B (paragraph [0036]); b)testing the at least one potential route segment to determine whether it creates an acute angle in the route within evaluating a package design utilizing CAD software 112 (Fig. 4, paragraph [0033]), which determines a violation of trace discontinuity rules 153, such as occurring an acute angle θ in segment 144 (paragraph [0038]); and c) preventing the at least one potential route segment from being included in the route between the start and target geometries upon determining that the potential route segment produces an acute angle in the route within the system 100 shown on the Fig. 4 for designing and evaluating the package design utilizing a trace discontinuity software 101, wherein as a result of evaluating, determining the violation of the trace discontinuity rules 153, generating a report summarizing violations of the trace discontinuity rules in step 221 as shown on the Fig. 8A (paragraph [0047]) and creating the package design of the model 124A shown on the Fig. 5 displayed on the graphical user interface 126, wherein package must meet very high standards, wherein any trace discontinuity (angle) does not exceed a turning angle (acute angle) (paragraph [0024]).

With respect to claims 2-8 and 20-24 Frank et al. teaches:

Claims 2 and 20: wherein an acute angle is created in the route when a route

segment in the route connects with a start or target geometry at an angle of less than 90° within the method and system for evaluating and designing the package, wherein the turning angle does not exceed the value greater then 30°, 45° (paragraph [0024]), wherein by geometrical rules acute angle is an angle less than 90°;

Claims 3 and 21: before step a), defining at least one border region about the start or target geometry as shown on the Fig. 5 illustrating signal net 130 from an input connector 132 to an output connector 134, wherein, for example, trace 144 (segment) has geometry starting from via 142 and ending by via 146 (paragraphs [0034], [0009]); and defining at least one routing rule associated with the border region by the method for evaluating signal trace discontinuities (routing) in the electronic design including creating an indicator as design rule check (DRC) associated with the electronic deign to identify violated trace discontinuity rules (paragraph [0015]), wherein step b) comprises: determining whether the potential route segment is within the border region within the method for evaluating signal trace discontinuities (routing) in the electronic design, wherein one signal net 130 is a subject to be evaluated (paragraph [0016]); and upon determining that the potential route segment is within the border region, testing the potential route segment to determine if the potential route segment meets the associated routing rule (paragraph [0022]);

Claims 4 and 22: wherein the routing rule prohibits particular routing directions within the border region that would result in an acute angle being formed at a connection point between a route segment in the route and a start or target geometry within generating the design of integrated circuit as a typical five-level package model

124A shown on the Fig. 5 (paragraph [0033]), wherein design is based on the CAD software 112 allowing routing in preferred direction (horizontal, vertical, diagonal) for each level (paragraphs [0035], [0036]);

Claims 5 and 23: wherein the border region neighbors a side of the start or target geometry having a vertical or horizontal orientation within the system 100 depicted on the Fig. 4, wherein graphical user interface 126 illustrates the result of the design as package model 124A having five levels, wherein trace discontinuity software 101 performs evaluation of the routing in the design including signal net 130 from an input connector 132 to an output connector 134, wherein, for example, trace 144 (segment) has geometry starting from via 142 and ending by via 146 (paragraphs [0034], [0009]); and the routing rule prohibits diagonal routing directions within the border region within the design as package model 124A having five levels as shown on the Fig. 4, wherein each level is prohibited to include routing in diagonal direction, wherein, as known in the art, each level has preferred direction of the routing between elements (horizontal, vertical, diagonal), but allowing to include different from preferred routing direction, when it's necessary, which is also demonstrated on the Fig. 6 (paragraph [0039]);

Claims 6 and 24: wherein the border region neighbors a side of the start or target geometry having a diagonal orientation within the system 100 depicted on the Fig. 4, wherein graphical user interface 126 illustrates the result of the design as package model 124A having five levels, wherein trace discontinuity software 101 performs evaluation of the routing in the design including signal net 130 from an input connector 132 to an output connector 134, wherein, for example, trace 144 (segment) has

geometry starting from via 142 and ending by via 146 (paragraphs [0034], [0009]); and the routing rule prohibits vertical or horizontal routing directions within the border region and the routing rule prohibits diagonal routing directions within the border region within the design as package model 124A having five levels as shown on the Fig. 4, wherein each level is prohibited to include routing in diagonal direction, wherein, as known in the art, each level has preferred direction of the routing between elements (horizontal, vertical, diagonal), but allowing to include different from preferred routing direction, when it's necessary, which is also demonstrated on the Fig. 6 (paragraph [0039]);

Claim 7: wherein the border region is defined to have a thickness that is equal to a minimum length of a route segment specified by a predetermined design rule within step 232 of the Fig. 8B for processing design database of package design to compare package design against other than discontinuity design rules (paragraph [0052]);

Claim 8: wherein the routing rule associated with the border region specifies that all route segments in the border region have the same routing direction within the design as package model 124A having five levels as shown on the Fig. 4, wherein each level is prohibited to include routing in diagonal direction, wherein, as known in the art, each level has preferred direction of the routing between elements (horizontal, vertical, diagonal), but allowing to include different from preferred routing direction, when it's necessary, which is also demonstrated on the Fig. 6 (paragraph [0039]).

With respect to claims 9 and 25 Frank et al. teaches: a method of routing a route that connects a start geometry and a target geometry, the route being comprised of one or more connected route segments within a method of evaluating signal trace

discontinuities in an electronic design (abstract), wherein as shown on the Fig. 2 five-level package model 24A includes plurality of traces 36, 40 and 44 and each is segmented into plurality of design elements such as 36A, 36B, 36C, 40A, 40B, 44A, 44B, wherein each trace having their own geometry with a start and target point (paragraph [0011]); a computer readable medium that stores a computer program for routing a route that connects a start geometry and a target geometry, the route being comprised of one or more connected route segments, the computer program comprising sets of instructions within a software product comprising instructions executable by a computer and stored on computer-readable media for evaluating signal trace (routing)(paragraph [0022]), comprising: a) producing a potential route segment as shown on the Fig. 5 representing model 124A and having, for example, trace 144 (segment) segmented into traces 144A, 144B (paragraph [0036]); testing the potential route segment to determine whether it creates an acute angle in the route within evaluating a package design utilizing CAD software 112 (Fig. 4, paragraph [0033]), which determines a violation of trace discontinuity rules 153, such as occurring an acute angle θ in segment 144 (paragraph [0038]); preventing the at least one potential route segment from being included in the route between the start and target geometries upon determining that the potential route segment produces an acute angle in the route within the system 100 shown on the Fig. 4 for designing and evaluating the package design utilizing a trace discontinuity software 101, wherein as a result of evaluating, determining the violation of the trace discontinuity rules 153, generating a report summarizing violations of the trace discontinuity rules in step 221 as shown on the Fig.

8A (paragraph [0047]) and creating the package design of the model 124A shown on the Fig. 5 displayed on the graphical user interface 126, wherein package must meet very high standards, wherein any trace discontinuity (angle) does not exceed a turning angle (acute angle) (paragraph [0024]); d) including the potential route segment in the route between the start and target geometries upon determining that the potential route segment does not produce an acute angle in the route the system 100 depicted on the Fig. 4, wherein graphical user interface 126 illustrates the result of the design as package model 124A having five levels, wherein trace discontinuity software 101 performs evaluation of the routing in the design including signal net 130 from an input connector 132 to an output connector 134, wherein, for example, trace 144 (segment) has geometry starting from via 142 and ending by via 146 (paragraphs [0034], [0009]), wherein package model 124A shown on the Fig. 4 **does not include any acute angles** comparing to the Fig. 5 showing the package model 124A during design before the evaluation; and e) iteratively repeating steps a), b), c), and d) within the system depicted on the Figs. 8A and 8B showing the process of performing evaluation of the package design 124A, wherein steps might be performed in a loop as returning back to iterate steps of evaluating and correcting routing in the design (paragraph [0052]).

With respect to claims 10-18 and 26-30 Frank et al. teaches:

Claims 10 and 26: wherein a route segment comprises an interconnect line or a via as shown on the Fig. 5 representing model 124A and having, for example, trace 144 (segment) segmented into traces 144A, 144B (paragraph [0036]), wherein signal net 130 is illustrated including traces 136, 140, 144 (interconnections) and vias 135, 138

(paragraph [0033]); and an acute angle is created in the route when a route segment in the route connects with another route segment in the route at an angle of less than 90° as shown on the Fig. 5, wherein, for example, trace 144 (interconnection) may include discontinuity 156 (acute angle), reported by DRC 155 that trace 144 has unallowable discontinuity exceeding 30° (paragraph [0038]);

Claims 11 and 27: wherein step b) comprises: referring to a pretabulated configuration table to determine whether the potential route segment creates an acute angle in the route within a design database 150 shown on the Fig. 4, wherein design database 150 contains information including a data of interconnections 136, 140, 144 and vias 135, 138, 142, 146 (paragraph [0036]);

Claims 12 and 28: wherein the configuration table is a line-to-line configuration table that contains various connection configurations between two interconnect lines and an entry for each connection configuration indicating whether the connection configuration contains an acute angle within design database 150, which contains information including a data of interconnections 136, 140, 144 and vias 135, 138, 142, 146 (paragraph [0036]) as shown on the Fig. 5, wherein interconnections 136, 140, 144 are in a various of configurations including discontinuities 156 (acute angles) (paragraph [0035]);

Claims 13 and 15: wherein the line-to-line configuration table contains connection configurations where at least one of the two interconnect lines has directions of 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° within design database 150, which contains information including a data of interconnections 136, 140, 144 and vias 135, 138, 142,

146 (paragraph [0036]) as shown on the Fig. 5, wherein interconnections 136, 140, 144 are in a various of configurations including discontinuities 156 (acute angles) (paragraph [0035]) and wherein discontinuities 156 are variations of the turning angle θ as a derivation angle (paragraph [0039]);

Claims 14 and 29: wherein the configuration table is a line-to-via configuration table that contains various connection configurations between an interconnect line and a via pad of a via and an entry for each connection configuration indicating whether the connection configuration contains an acute angle as shown on the Fig. 5 representing model 124A and having, for example, trace 144 (segment) segmented into traces 144A, 144B (paragraph [0036]), wherein signal net 130 is illustrated including traces 136, 140, 144 (interconnections) and vias 135, 138 (paragraph [0033]), wherein, for example, via 138 creates discontinuity 156 (acute angle) with trace 140 interconnection (line) (paragraph [0034]);

Claim 16: wherein the line-to-via configuration table contains connection configurations of via pads having different shapes as shown on the Fig. 5 representing model 124A and having, for example, trace 144 (segment) segmented into traces 144A, 144B (paragraph [0036]), wherein signal net 130 is illustrated including traces 136, 140, 144 (interconnections) and vias 135, 138 (paragraph [0033]) including different shapes of pads or connectors (paragraph [0013]);

Claims 17 and 30: wherein the configuration table is a via-to-via configuration table that contains various connection configurations between a first via pad of a first via and a second via pad of a second via and an entry for each connection configuration

indicating whether the connection configuration contains an acute angle as shown on the Fig. 5 representing model 124A and having, for example, trace 144 (segment) segmented into traces 144A, 144B (paragraph [0036]), wherein signal net 130 is illustrated including traces 136, 140, 144 (interconnections) and vias 135, 138 (paragraph [0033]) including different shapes of pads or connectors (paragraph [0013]) since trace discontinuity software 101 shown on the Fig. 4 performs an determination and evaluation trace discontinuity (acute angles) within package design 124 by processing design database 150 (storing the information of the package design), wherein the signal net 30 has a start and end point 132 and 134 respectively and wherein package design 124 include variations of configurations of the interconnect lines, vias and pads and software 101 has an ability to response to user inputs (paragraphs [0033], [0035]);

Claim 18: wherein the via-to-via configuration table contains connection configurations of via pads having different shapes as shown on the Fig. 5 representing model 124A and having, for example, trace 144 (segment) segmented into traces 144A, 144B (paragraph [0036]), wherein signal net 130 is illustrated including traces 136, 140, 144 (interconnections) and vias 135, 138 (paragraph [0033]) including different shapes of pads or connectors (paragraph [0013]) since trace discontinuity software 101 shown on the Fig. 4 performs an determination and evaluation trace discontinuity (acute angles) within package design 124 by processing design database 150 (storing the information of the package design), wherein the signal net 30 has a start and end point 132 and 134 respectively and wherein package design 124 include variations of

configurations of the interconnect lines, vias and pads and software 101 has an ability to response to user inputs (paragraphs [0033], [0035]).

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-30 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of copending Application No. 10/443,315 (hereinafter "'315 Application"). Although the conflicting claims are not identical, they are not patentably distinct from each other because instant Application and '315 Application are claiming common subject matter as follows: they both claim a method of removing/avoiding acute angles during a routing process in the integrated circuit design, wherein integrated circuit layout include geometric representation of electronic or circuit IC components (circuit modules) and geometric representation of wiring (interconnect lines) that connect pins of the circuit modules. And during evaluations of the routing if any acute angle is occurred in the routing and detected by design rule check process (DRC violation), then a process of correction/prevention the routes is performed to remove the acute angles from the route, wherein the route is presented as a plurality of segments and segments can create acute angles.

The independent claims 1, 9, 19 and 25 of the instant Application and correspond to the independent claims 1 and 11 of the '315. The corresponding claims are different in their wording, but clearly disclose the same material.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen Rossoshek whose telephone number is 571-272-1905. The examiner can normally be reached on 7:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner
Helen Rossoshek
Au 2825

STACY A. WHITMORE
PRIMARY EXAMINER